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Permeating the barriers between the individual and policy designers in Pakistan: applying systemic design to gender transport poverty

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Abstract Transport poverty and the associated, multiple levels of deprivation experienced by women is a wicked problem. Gender transport poverty in Low Middle Income Countries is an issue of longstanding concern but is one in which little headway seems to be made. The WEMOBILE project has used (auto) ethnographic and empathic design approaches to study gender transport poverty in Malaysia and Pakistan. The paper explores the insights provided from employing a systemic design lens to comprehend the structural barriers, systemic architecture of the problem, interconnections and linkages with other elements and factors, and the gaps which hinder the effectiveness of existing solutions, and secondly how such an approach may be used to (*re*)present issues around gender transport poverty in ways which can lead to policy and operational changes.

Keywords: empathy, co-design, gender sensitive transport, systems thinking, LMICs, Pakistan, ethnography

1. Introduction

This section introduces the challenge in terms of UN goals, before discussing gender transport poverty, and how this is manifest. The aims of the WEMOBILE project are presented along with the methodology used to understand the effects of gender transport poverty. The second half of the paper looks at the application of systemic design thinking and how the diagrams could be used to represent issues to policy makers to effect sustainable change.

Women's mobility has been recognized as a key issue by the United Nations. UN Goal 5¹ addresses gender equality along with the Millennium Development Goal 3², which aims to promote gender equality and empower women. Globally, women and girls continue to suffer discrimination and violence. Gender equality is not only a fundamental right but is also seen as necessary for a peaceful, prosperous and sustainable world.

Globally women do not enjoy the same mobility freedom as men. For example, women face more harassment on transport and in public spaces (e.g. Thompson, 1993; Osmond and Woodcock, 2015; Madan and Nalia, 2016), are more seriously affected by road rage (Gil, 2018), do not have their journeys adequately represented in future transport scenarios (CIVITAS, n/d), are underrepresented in STEM subjects (only 24% of women graduate from Science, Technology, Education and Mathematics³) and in transport employment (with only 22% of the transport workforce being women in Europe^{4, 5}). 'Work arounds' have included gender-segregated transport (e.g. Dunckel-Graglia, 2013; McLeod, 2018), zero tolerance of harassment on public transport, gender aware planning (Rakodi, 1999) and products designed to increase attention to the aggressor (Saul, 2017).

UN Goal 11⁶ relates to the need to make cities inclusive, safe, resilient and sustainable. It is predicted that by 2030, 5 billion people will live in cities. Cities need efficient urban planning and management. Currently cities are not coping with rapid urbanisation and related problems of sanitation, transport and pollution. Women are key drivers in sustainable forms of transport.

Gender transport poverty is a wicked problem, which 'cannot be adequately comprehended in isolation from the wider system in which they are part' (Burns, 2017). Wicked problems (Rittel and Webber, 1973) are defined as social or cultural problems difficult or impossible to solve, for example, because of incomplete or contradictory knowledge, the number of people and opinions involved, the large economic burden, and the interconnectedness with other problems. An approach is needed to untangle wicked problems, such as gender transport poverty. This paper argues that systemic design research may provide this.

¹ <https://www.un.org/sustainabledevelopment/gender-equality/>

² <https://www.un.org/millenniumgoals/gender.shtml>

³ <https://www.stemwomen.co.uk/blog/2018/03/useful-statistics-women-in-stem>

⁴ https://www.etf-europe.org/wp-content/uploads/2018/09/EU-Declaration-equal_opportunities-EN.pdf

⁵ Although no figures exist for Low middle-Income Countries, this is likely to be substantially less than 22% of women are in paid employment

⁶ <https://www.un.org/sustainabledevelopment/cities/>

Mobility issues in Low-Middle Income Countries are systemically linked to socio-political and cultural problems. It is not just that women have to take longer, more expensive and inconvenient journey or are denied the ability to make that journey it is the wider implications of this e.g. stress of managing unintegrated journeys, ill health caused by exposure to high levels of pollution whilst walking, injuries sustained while riding side-saddle on motorbikes or by trapped clothing on vehicles. These are systemic issues. The Centre of Economic Research Pakistan survey found that nearly 30% of respondents considered it “extremely unsafe” for women to walk in their neighbourhood,” and around 70% of male respondents discouraged “female family members from taking public wagon services” (Sajjad et al., 2017). The gender gap in policy designers and transport service providers means that women transport users in LMICs not only do not have a voice, but that there is an urgent need to find new ways of presenting their problems to increase not only gender sensitive transport planning but also to provide methods and information for more human-centred approached to the development of sustainable transport systems.

2. The WeMobile project

WEMOBILE (<https://womenmobility.com/>) (funded by 18 months by the AHRC (UK) under the Global Network fund) is a collaborative, international project between UK, Pakistan, Malaysia which aims to use empathic and participatory design approaches to enable policy designers and other stakeholders to understand women’s mobility problems in LMICs. It aims to capture and (re)present the problems women in LMICs face in their everyday travel. Whilst all sectors of society may face such problems, the burden of women is disproportionately higher as they earn less and take on multiple roles (e.g. wage earner, housekeeper and care giver).

The overall goals of WEMOBILE are:

- To raise awareness of barriers to women's mobility and the effects of this e.g. in terms of access to employment and other opportunities and in relation to quality of life.
- To foster research co-operation between Malaysia, Pakistan and UK in addressing issues relating to barriers to women's mobility in order to provide a foundation for future research applications.
- To share and exchange knowledge.
- To act as a catalyst for integrating national work in each country, adding value and weight to the voices of local, national and international organisations.
- To support early career researchers.

In terms of methodology, the objectives have been met through targeted workshops in Malaysia and Pakistan; small scale empathic and co-design activities with female transport users in each country to provide culturally specific, authentic experiences of mobility problems faced by women and context specifics concept solutions and recommendations.

2.1. Systemic design applied to gender transport poverty

Designers have been addressing wicked problems for decades – not only in terms of design of artefacts but also in terms of the design methods, questioning and engagement with multi stakeholders. In the debates (e.g. around problems of ageing, sustainable energy and transport) design provides a ‘practical problem-solving epistemology’ (Jones, 2014). Cross (2001) explained:

“So we might conclude that design science refers to an explicitly organised, rational and wholly systematic approach to design; not just the utilisation of scientific knowledge of artefacts, but design in some sense a scientific activity itself.”

The WeMobile project draws together designers, planners and ergonomists using design research methods to understand the lived experienced of female travelers in Pakistan and Malaysia (as representative LMICs). The five principles of systemic design practice as outlined by Jones (2014) has led us to the following conclusions for Pakistan:

1. There is some understanding of women’s mobility problems
2. Piecemeal solutions have been attempted
3. There is (some willingness) to address gender transport poverty (but see some of the comments from the world café)
4. Dialogic processes and iterative inquiry are lacking. A structured approach is needed which enables all stakeholders to have a holistic view of the problem.
5. A holistic and inter-connected approach is lacking that leads to solutions resulting in creating new problems instead of solving old ones.
6. People are willing to support, contribute, and work towards improving mobility for women.

Systemic causal loop diagram (Gharajedaghi, 2011) can be constructed from literature and primary research and enable visualisations and interconnections to be made between concepts, elements, phenomenon, and stakeholders. They enable stakeholders to gain an overview and common understanding of the problem space and to see where interventions may be made. They also give an understanding of the relationship between two elements with a ‘+’ or a ‘-’ sign implying similar or inverse impact, respectively. The systemic causal loop diagram shown in Section 4 have been constructed from an analysis of the information provided in stakeholders workshops, interviews and ethnographic studies and represent both the barriers to transport and solutions which have been attempted to address these.

3. Women in Low-Middle Income Countries

Pakistan ranks 128 out of 182 on Human Development Index (2010), 124 out of 155 on Gender Development Index (2009) and 132 out of 134 on the Global Gender Gap Report (2009). The ILO stated that ‘transport remains a neglected area among gender specialists and transport specialists are still reluctant to take on gender issues. Until this is done, the prospects for many women who live in areas characterized by poor physical accessibility and inadequate transport will remain poor’. The

network's development is timely given recent initiatives in Pakistan. For example, the PAKSTRAN project looking at sustainable transport policy and mobility in rural access, with a special focus on gender; the 'decent transport project pilot' looking at safer public transport for women by the ILO; the Government of the Punjab's planning department (TPU, established in 2011) has key objectives to develop 'professionally' prepared sustainable transport plans, with key guiding principles of transparency, equity, honesty and integrity. The development of transport master plans for cities such as Sheikhpura, Sahiwal and Karachi and intermodal transport provision has clear resonance with SUMPs being advocated across EU.

Malaysia ranked 111th (out of 145) on the Global Gender Gap Index for 2015, with an especially poor rating in the political arena. Although there has been an increase in women's participation outside the home in which travelling plays an integral part. However, the complex journeys women are required to make in their familial, social and economic roles has not been addressed, whilst recognised as a key question has not been addressed in a concerted manner.

Pakistan

This paper focuses specifically on the data from Pakistan and WeMobile's efforts to apply design research tools to understand and represent issues around gender transport poverty in ways, which will be actionable for transport policy officers and operators. While transport poverty has been conceptualized, measured and made a part of policy-making in many developed countries (Lucas, 2012), there have been no attempts to study it in developing countries such as Pakistan.

To have an overview of population and statistics, according to United Nations, "sixty per cent of the global population lives in Asia (4.4 billion)" (United Nations, n.d.). The 6th Population Housing Census of Pakistan (2017) shows the total population of Pakistan to be 207.7 million, with 106 million (51%) men, 101 million (49%) women, and 10,418 transgender persons. For the province of Punjab, there are approximately 1 million more men than women. For Lahore, where this study takes place, the 2017 census showed that this was the second most populous city, with an 11.1 million population.

In Punjab, the female Labour Force Participation Rate (LFPR) in 2014-15 was 27.8% as compared to the male LFPR of 69.4% (Punjab government, 2018). Hence, men have a higher literacy rate and higher participation in the Labour Force. Moreover, Punjab Gender Parity Report (2018) revealed that the total number of vehicles owned were 1,649,044 vehicles in 2017, out of which only "1% of vehicles were owned by women and 99% were owned by men." The licences situation seems to be bleak as well. "While 5.2% of licences were issued to women, only 1% of women had a vehicle registered in their name". These figures illustrate a gender gap in terms of ability to commute and employment across all sectors and in transportation.



Figure 1: Images from women in the female compartment of a bus and walking on the street

To develop a more nuanced understanding of barriers to women's mobility the WEMOBILE team conducted phenomenological interviews (Bevan, 2014) with multiple stakeholders, combining visual and auto ethnography (Schwartz, 1989; Marcus, 1995; Ellis, Adams and Bochner, 2011), hosted a one-day multi stakeholder world café (Brown, 2010) with transport users, operators and government officials using participatory approaches with participants to understand and characterise women's journeys, and a focus group with representatives from civic, government, and academic sectors in Lahore. To address the shortage of data in Pakistan regarding women's mobility a more quantitative on-line survey was also distributed in Lahore.



Figure 2 Preparing for the Focus group and symposium in Lahore

From the on-line survey in Lahore

The survey contained questions related to modal choices, expenditure, and satisfaction levels with ventilation, cleanliness, experience etc., and issues that might stop them from using transport. In total, 40 women and 7 men from Lahore responded to the survey. Their distribution across mode of transport is shown in Table 1. Most of the respondents were full-time employed 64% while 32% were students.

Table 1: Survey respondents use of transport to and from employment/education

Mode of public transport	% of men using public transport	% of women using public transport
Bus	2.0%	11%
Rickshaw	0%	9%
Qingqi	0%	4%

In Lahore, most of the female respondents did not own private vehicles and were therefore either dependent on public transport or other family members. This may explain why 21% women demanded more frequent buses while only 2% commented on this. Women spent 20%-40% of their income on travel, whereas men only spent 10%. There are incidents of sexual harassment that are perpetuated by fellow passengers (19%) and other road users (32%)(see Figure 3). This contributes to the higher level of dissatisfaction towards public transport, expressed by women.

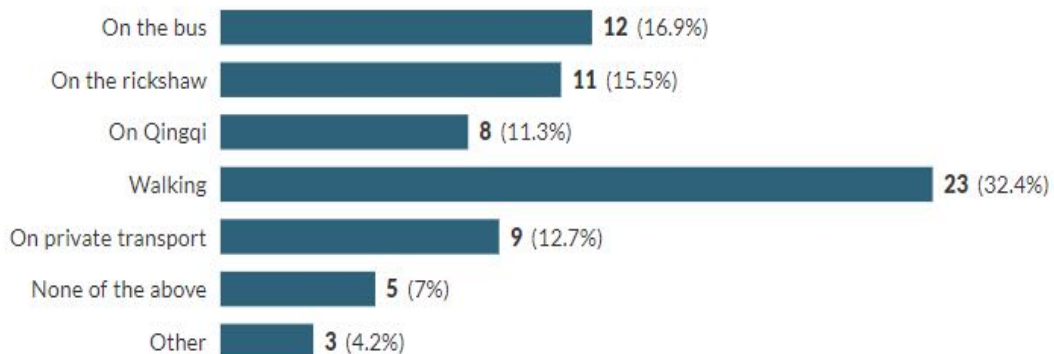


Figure 3: Harassment faced by women on different modes of transport

Harassment typically takes the form of staring and lewd comments. Women also commonly reported touching/groping and being followed by a stranger. About 60% women and 28% men rated highly the importance of safer transport and cities, however 67% women admitted that they simply ignored the harassment while 27% women told their friends or family. The vehicle driver/ conductors were responsible for the harassment in 27.5% of the cases against women. This behaviour results in none of the respondents feeling safe walking to the bus stop after daylight.

A young girl while suggesting improvement in the present transport system, shared;

'it's the general sense of respect which should be created, creating more space in buses doesn't makes sense as there is a need of space in brains.'

Another woman commented,

‘if I ever have to use public transport which is extremely rare, then the discomfort of the misogyny that surrounds us on the streets and public spaces.’

Additional comments illustrate that women were not only threatened by the attitudes of men but sometimes the social stigma their mobility created, with comments on *‘the narrow-mindedness in the society’* and the *‘social opinion of other women’*. The top four worries for women in travelling to work/education were harassment, being late, and travel expense and time constraints. Here, the barriers included ‘household responsibilities’ and ‘wasted time’, which was caused by being dependent on others. In contrast, the top worries for men were the condition of roads and noisy traffic. Significantly, they did not mention safety issues or time constraints.

Results from the focus group



Figure 3: Focus group as a moderated panel discussion

A moderated discussion took place between representatives of the Center of Economic Research in Pakistan, Women-on-Wheels initiative, civic sector, Careem (an on-demand taxi service, similar to Uber) and the local government. The focus group discussion included a panel discussion along with a symposium showcasing the projects, research, and efforts by government, various organizations and groups in Pakistan working to improve women’s mobility. The conversation in this focus group

revolved around sharing individual perspectives coming from different sectors and backgrounds, exploring the different barriers and challenges women face, and evaluating existing and brainstorming possible solutions for improvement in the future.

Highlights from the conversation:

“there is this taboo that women are facing in terms of using these private modes because of which they are 30% more likely than men to be using public transport....” - Program Manager at CERP

“Unfortunately, the fact is that the government has never taken these issues as seriously as they should have, where 48% of our population is women, where we mostly have them as you know, wives or sisters or daughters or mothers but the economic participation and to give them a prominent role in our society and on autonomy, there has never been an initiative...” - Salman Shahid, Director General Chief Minister’s Strategic Unit and initiator of Women on Wheels

“Government has taken some initiatives for women mobility such as the Pink buses that they introduced but unfortunately since they were “pink” buses, it didn’t turn out to be a very successful initiative. I think the local government and planning department should have female planners in them because the more female planners exist, the more women development would occur.” Farhana, Punjab Assembly representative

“My stance has always been that women-only services, women-only buses, women-only bus stops cannot be the only solution to move this society forward. We have this audience here, it’s a mixed audience and I hope all women here feel safe and secure and that’s how the rest of our country needs to be... Since women are more prone to use public transportation, Careem’s 80% base is women.” Experience manager, Careem.

Conclusions from the discussion:

1. An agreement on mobility being a significant challenge for women in Pakistan and has to be addressed at governmental, private, not-for-profit, and civic level.
2. Willingness from the different sectors to collaborate and work together to address the issues.
3. Increase in female representation in government and private sector helped bring forward women’s perspective. However, there is a dire need to have female representation in urban planning and strategic teams at private, public, and governmental levels.
4. Civic organizations play a crucial role in providing focused and targeted innovation for different communities and need to be supported.
5. All-women buses and only-women transportation modes, though having good intentions have failed to improve mobility.

Results from the discussions at the World Café

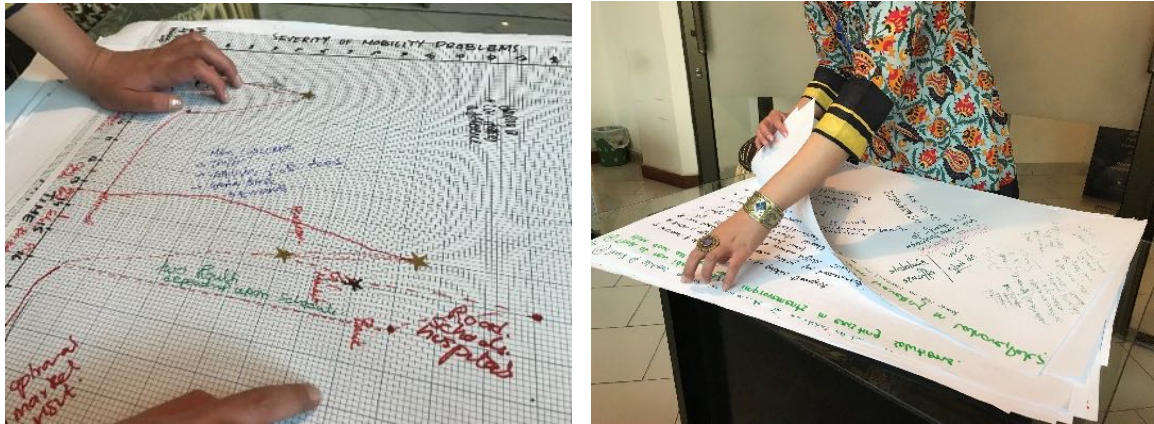


Figure 4. Documenting the results of creative café in Lahore

A Creative Café, also known as a World Café, is a collaborative workshop that brings together individuals who have experienced the issue and are well informed about it. By creating an engaging and democratic atmosphere, the Café promotes a space to co-create and co-design solutions for current and future issues, while ensuring the voices of all participants are heard equally (The world Café; Klaiman & Guadarrama, 2016.) A creative café workshop was conducted in Lahore, with 20 participants who were working women, housewives, government representatives, and women rights activists. The discussion was conducted in groups based on four key areas: challenges/issues, their journeys, change over time in mobility, and possible solutions.



Figure 5: Conducting the creative café workshop in Lahore

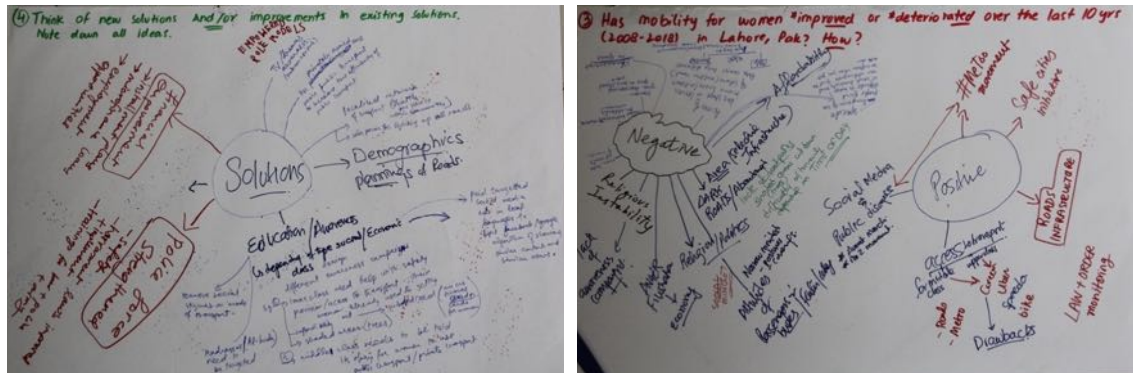


Figure 6: Sheets from the group discussion tables

Key points which emerged from the conversations:

- Harassment of women on public transport is a major issue as pointed out by most participants.
- Challenges differ for different economic classes and in different geographic and economic regions.
- Middle to upper-middle class women choose to have their own cars because of the many challenges, which is expensive but comparatively safe and reliable
- Women do not feel safe walking on the side of the roads.
- Significant planning for a trip is required, checking availability and financial constraints, which often leads to cancelling plans, leading to travel avoidance.

Synthesis of barriers to women's mobility

Mobility barriers women face in Pakistan - Lower middle to upper middle economic class (family earning Rs.45,000-300,000 per month)

Social/ Societal	Cultural/religious	Economic	Safety	Health	Political/ Govt	Geographic/ Climate	Urban Planning/ Architectural	Transport operation	Transport Infrastructure and design	Regulations
Harassment is one of the biggest issues. It include ogling, staring, following, catcalls, inappropriate touching in public spaces, nitng sexual remarks, inappropriate comments among others. "About 42 percent of women commuters report facing harassment at bus stops, with higher rates at LTC bus stops, compared to Metro bus stations. Neighbors and family members doubt their character and talk bad about them. This causes restriction for most women types of sexual harassment at bus stops include staring, stalking.	Reputation/respect and cultural issues for women who stay out of home for long periods of time for their work. Neighbors and family members doubt their character and talk bad about them. This causes restriction for most women	Urban centres like Lahore have a classism stretching people to present an image which is more than what they are. Circumstances and barriers differ in different economic classes, their modes of transportation widely differ as well.	"There are significant safety concerns on buses. About 90 percent of women commuters report sexual harassment on buses, with a higher ratio on LTC buses. The main types of sexual harassment include inappropriate touching, pushing and inappropriate touching."	Walking is not a natural part of their daily routine due to social and essential need for a healthy life. For exercise most women have to go to parks or join a gym, which again require a mode of transportation. Therefore, it's essential for women to have a safe mode of transportation especially for mothers and married women.	Less or no female representation in policy making. Need for female planners to be part of urban planning projects so that they can empathize with the female perspective and design plans that incorporate that.	Extreme hot weather conditions make it difficult to be outdoors	Accessibility for disabled people is not a priority. Most buildings don't have ramps or accessible entrances and exits. The buses don't have any arrangements to facilitate the disabled	Misconceptions and misinformation about the bus systems. No knowledge of bus routes and timings or payment methods. E.g. Speedo bus doesn't connect the routes to the bus stop. Participant in world café said "you can't use it without a card" when in reality you can pay cash as well.	Transport system is not connected far end to end route. To reach the metro, most people have to use rickshaw or qingqi or car. Metrobus transport doesn't connect the routes to areas. Disconnected pathways and walkways. Especially being a woman, it adds more risk and uncertainty when walking on the roads.	Article 9 Security of Person reads: "No person shall be deprived of his life or liberty save in accordance with the law."
Constant fear. Women don't feel safe on roads. Constant fear of purse being snatched or being kidnapped or something bad happening to participants of world café reported the same as well as	Gendered urban environment	Careem is an expensive mode of transport for middle class women and is not an affordable mode on daily or regular basis	Exposure to unsafe modes of transportation: sexual harassment on buses, kidnapping and human trafficking, murder				No pedestrian signals or walkways in most areas. Metrobus has installed the signals, mean in areas where they have been installed	Harassment in local vans and bus stops	Bus stops are located far away from residential areas.	Article 14 Freedom of Movement reads: "Every citizen shall have the right to remain in, and subject to any reasonable restriction imposed by law in the public interest, enter and move freely throughout Pakistan, and to reside and settle in any part thereof."
Lack of empowered female role models in media, popular culture references of social media	In most households, if there is one family car, the husband or father/brother gets the priority on its usage since he is the breadwinner.						No footpaths on most roads			Article 25 Equality of Citizens states that: "All citizens are equal before law and are entitled to equal protection of law. There shall be no discrimination on the basis of sex alone. Nothing in this Article shall prevent the State from making any special provision for the protection of women and children."
There is no concept of women walking on the roads or cycling to get to places. It used to be a rare sight. Metrobus has become a rare sight. Socially and culturally uncomfortable for women to walk or cycle.	Men considered experts in car handling so most women are not given the responsibility of a car. Even when they do get the trust, going to workshops is considered a rare sight. The workshops are not considered places for women. They have no places to sit for women, they mostly have no women, the men at the workshop add									Article 26 Non-discrimination in respect of sex. "There shall be no discrimination against any citizen on the ground of race, religion, caste, sex,...." It adds that nothing in the above clause "shall prevent the state from making any special provision for women and children."
high dependency on others which limits freedom and independence and thus their exposure and growth. Some aged males have a high dependency on others. They walk to destinations, socialize with friends on the streets or play outside the house.	Mother the main caregiver for kids so the age of dependency is a major role in her mobility patterns.									
High dependency on males for travel needs. Are bound to have a trustworthy male for travel- especially someone from the family	Have to come and leave at an appropriate time due to issues of respect, virtue and dignity									
	The concept of 'Pardah' in Islam which restricts a lot of women (living in conservative families) from leaving the house (women are not supposed to see women) and going out of the house without properly covering themselves									

Personas for Pakistan

The results from the various studies were used to create an understanding of mobility systems and structures using the '10 stages of women,' which divides women into ten age groups. For each age group, the factors of mobility, barriers, primary occupations, and roles differ. Figure 1 below shows stages with their primary occupations and social expectations. This is important because it provides a much needed, culturally specific representation of women in Pakistan, which was lacking when we started the research. Moreover, since the mobility differs for women belonging to different economic class and financial backgrounds, this representation is of women belonging to the middle to upper-middle financial stature, which means annual family (not more than 2 kids) income of US\$9000 and above. In most research this economic class is ignored and only the lower economic class is studied, however middle and upper middle class is an essential part of the economy of Pakistan. The 36.38% (Pakistan Bureau, 2018) of those who live in urban centres of Pakistan have female literacy ratio of 71% (2014-15) (2017 statistical, 2018).

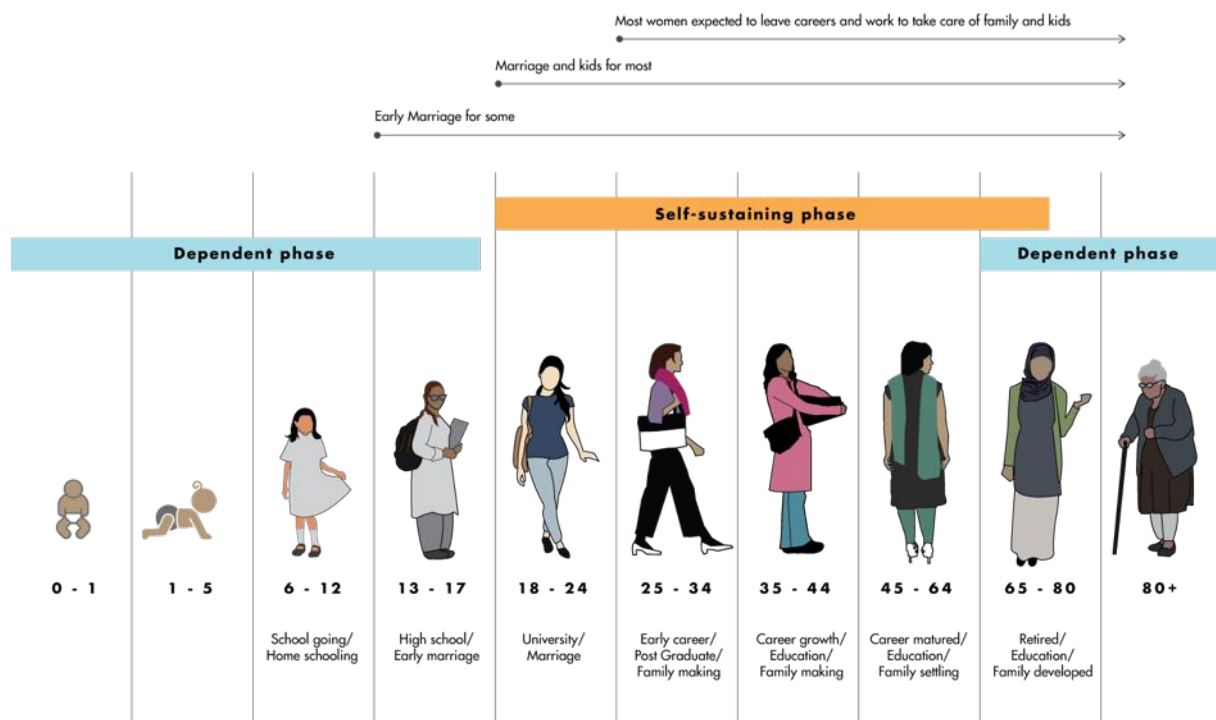


Figure 7. The 10 stages of women in Pakistan

Modes of transportation for all phases are:

- Public transportation: buses primarily (no in-city trains available)
- Rideshare: Careem and Uber
- Private-public transportation: Rikshaw, Chingchi, Taxi
 - Private-personal transportation: Personal/Parent's/Guardian's cars or motorbikes

The stages divide into two main categories: dependant and self-sustaining phases. In the dependent phases, at the beginning of life, journeys are made to school/universities/offices, meet friends and family, and to attend events and gatherings. Toward the end of life, journeys are made for medical needs and to meet family and friends. The dependency falls on fathers, brothers, husbands, sons, and women in the self-sustaining years of their lives.

Mobility barriers for the dependent phase include:

- High dependency on others, which limits freedom and independence and thus their exposure and growth. Same aged males have a fair amount of independence to walk to destinations, socialize with friends on the streets or play outside the house.
- Exposure to unsafe modes of transportation: harassment, rape, discomfort, kidnapping and human trafficking and murder.
- Unable to walk or bicycle on the streets due to cultural and societal norms.

Mobility barriers for self-sustaining phase:

For the self- sustaining phase, it is not implied that women are entirely independent and live a self-sustaining life; instead it means that these women have the choice, and opportunity to do so, accepting the caveats and risks. Women can legally drive and can choose to buy their own cars. They can get a paid job outside home and chose to live independently in a hostel, apartment, or house. However, societal expectation suggests that they get married and preferably move in with their spouse or spouses' families. Those women, who don't own personal vehicles, depend on their fathers, husbands, brothers, sons, and other women who can drive and have a car for mobility.

Harassment on buses, bus stops, and while walking on the roads was reported to be the biggest barrier. Tayyaba, a motorcyclist and founder of Rides and Miles (female motorcyclist training academy), who was a part of the focus group shared that

"I was riding my bike yesterday and two boys were crossing me and cat-called on me saying, "Darling, where are you going?"... Harassment is a big issue in Pakistan, especially if you are travelling on a bike. In my routine life, if I go out of my home twice or thrice, I face harassment twice or thrice too, whether it's through words or eyes."

Other challenges include:

- Safety concerns due to cases of kidnapping, theft, acid attacks, and murder.
- Expensive of private vehicle ownership.
- For women with kids, the age of children defines their mobility. Having an infant might make it almost impossible to leave the house unless there is help such as a driver and a car.
- If the family has one car, the preference is often given to the husband or father as they are considered the breadwinners and finance providers.
- Most places are inaccessible to take baby strollers and therefore restricts.

- Influences of the dual role of women in terms of earners and domestic workers. No matter what kind of work they do, they are expected to fulfil all responsibilities of the house.
- Most offices do not have day care centres forcing women to either leave the job or take a leave of absence.
- Inappropriate attitude of male drivers towards female drivers.
- Most car repair workshops are not female friendly and do not have any female representation, thus making female car owners depend on men in their house for car repairs.

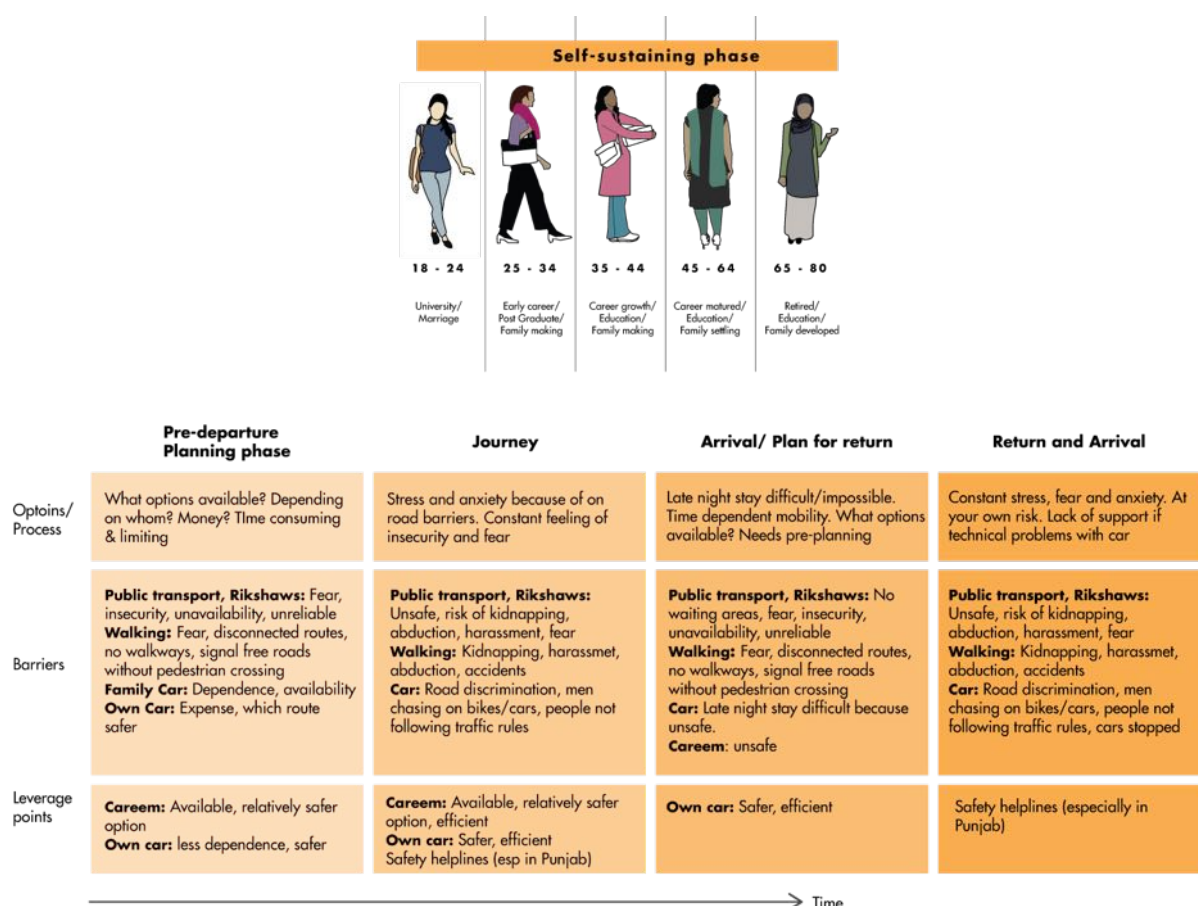


Figure 8: Characteristics of the self-sustaining phase, broken down across journey stages

Figure 8 shows the characteristics of the self-sustaining phase in terms of transportation options, barriers, and leverage points. In most cases, women require more time to plan for their trip (shown by survey results, focus group, and creative café responses), which causes inconvenience and discourages them to go out at all. It also results in cancelling plans or meetings. Planning includes: making sure the car is not used by anyone else in the house so that they can use it (in the case of one family car); making sure they have money if the option available is rideshare (Careem or Uber); waiting for the rideshare or rikshaw driver to show up to pick them; and ensuring it is not a late night plan because most women do not feel safe travelling in public transport or using rideshare at night. Planning also means making sure they have figured out the mode, time, and route to return home.

4. Systemic Synthesis

The systemic synthesis aids in configuring the interconnections and linkages of the 10 stages of women with the cause and effect cycles they go through, government support, and gaps in the system. It helps policy makers see the narrative from the women's perspective in connection with the solutions they provide and the gaps that exist in meeting the needs. The maps give a brief overview of two to three main gaps; however, they can be expanded to incorporate more elements.

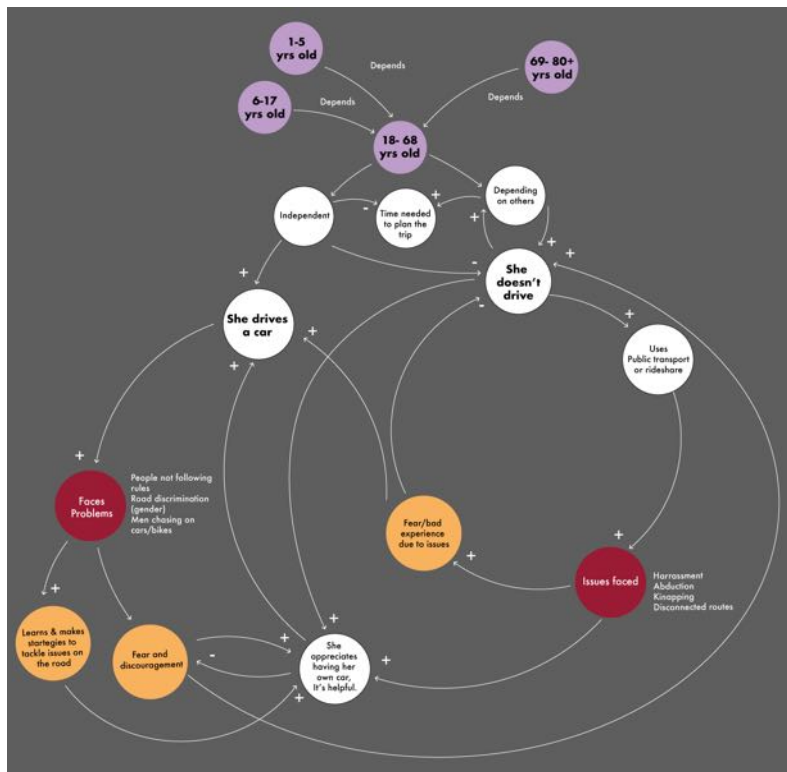


Figure 9. Systems causal loop diagram linking the 10 stages of women and the issues they face

The women in the self-sustaining phase, aged 18-68, are the focus and have two ways of looking at mobility: being dependent on others and external modes of transportations such as buses, Careem, Rikshaw, family car, or can be independent by having their own vehicle. The more dependence they have on other modes, the more time it takes to plan the journeys and ensure availability. The concept of everyone owning their own vehicles is not advisable since it will have a negative impact on the environment; however, this is a synthesis of findings showing a pattern in the existing circumstances.

Women face barriers and challenges whether using their own vehicle or using other modes of transport. In case of buses, rikshaws, family car, or other third-party modes of transportation, as discussed earlier, she faces harassment, time delays, longer wait periods, uncertainty, and fear. In case of her own vehicle, she faces discrimination and harassment on the road (by other drivers on the road especially male), affords higher expenses, and fears vehicle theft and her own safety.

If we look at the 'can't drive' cycle, which is a balancing loop, the more the woman experiences problems and issues with external modes of transportation, the more they begin to appreciate having their own vehicle. At this stage, women who can stretch their finances and afford a vehicle will acquire one. However, some women can never get out of this vicious cycle due to limited financial resources to afford one. Careem and Uber do offer great support in this scenario.

In the case of 'can drive' cycle, when the woman faces challenges and issues, she either learns to tackle them by finding strategies such as not slowing down when driving late night, using window blinds so that others cannot see if it is a female driver; or develops a sense of fear and insecurity. In the latter case, if some women experience traumatic incidents or accidents, they give up driving. Listening about these experiences also might discourage other women from learning how to drive or get their own vehicles.

There is no option of being able to walk or bicycle. Walking on the roads is the most unsafe and uncomfortable options for any woman, therefore, most would avoid it unless walking in marketplaces or malls or highly necessary. Since walking is not a default option for women, unlike in other countries, they cannot leverage the ease or health benefits of it.

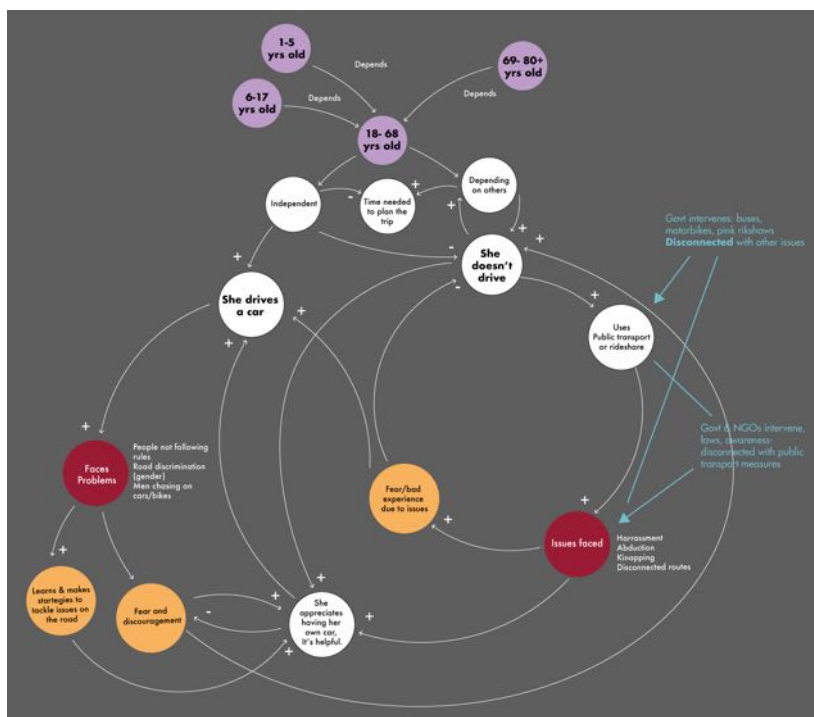


Figure 10. Systems causal loop diagram suggesting 2 main gaps that government and not-for-profit sector needs to address

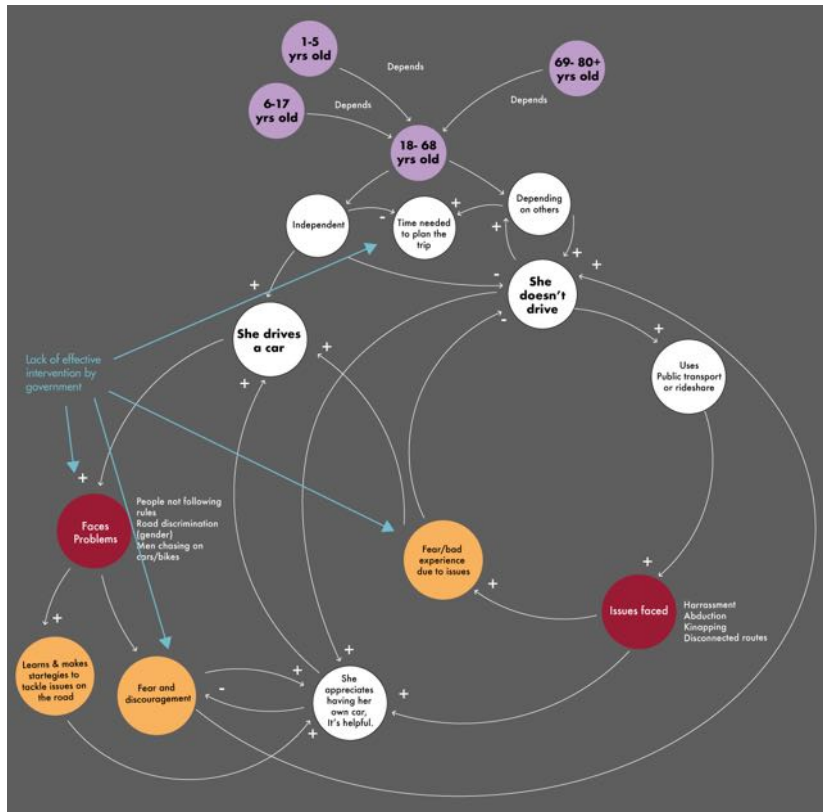


Figure 11: Areas where government intervention lacks

Government interventions are made in the area of public transport facilities as figure 11 shows. The government tried providing pink buses (women only) that failed. To help with enabling women to travel safely they also supported projects such as safe cities, women on wheels, however, the role is limited. The biggest gap in these interventions is the disconnect with other gender related issues associated with mobility as the diagram points out e.g. bus services are improved but harassment issues are not addressed, and more buses are added but the end-to-end routes are not available leading to massive disconnects making public transport unreliable.

There are disconnects in the interventions by the three sectors i.e. private, public, and government due to lack of collaborations and discrediting each other's work instead of building upon it. The not-for-profit sector tries to intervene in the issues of harassment and safety by doing awareness campaigns, research projects, and raising a voice against them. However, it can only be made more effective if the government steps in and incorporates it in their plans and work.

The 'can drive' loop has no significant interventions by the government. There is an established helpline for women in Punjab, which is not highly active and provides with basic help such as connecting with police or support nearby. Government also introduced female traffic police, however, it failed miserably and was stopped.

"It was very difficult to stand on the roads and manage the traffic. People wouldn't obey the instructions, also a lot of men on bikes and cars would harass us and would stop their

vehicles to talk for no reason. There were catcalls. There was one time, a guy yelled 'go home! This is not your job.' Female Traffic Warden

Government's women-on-wheels project has been a great success so far. It encourages women to ride bikes, also provides easy instalment packages to buy one, and does advocacy for their safety and freedom. However, the support offered by government is only associated primarily in the provision of public transportation, that too is extremely limited. The other side of this narrative is a blind spot, including policies and infrastructure to encourage pedestrians and providing them safety.

5. Conclusion

To conclude, the system largely lacks a gender sensitive and user-centered approach, data, and holistic strategies which connecting solutions to the resolution of issues across the domain System archetypes such as "shifting the burden", "fixes that fail", and "limits to success" (Braun, 2002) exist causing ideas and plans to fail in achieving the desired impact. To address a systemic design research approach can enable sectors to collaborate in holistic strategies and implementation plans, dividing responsibilities and financial burdens. Stakeholders will have to be involved at every stage, empowering them to participate with not only suggestions but also actions.

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